

REMARKS

Claims 1-13 are pending in the present application. New claims 12 and 13 have been added. The present claim amendments find support in the originally filed claims and in specification, at least, at page 7, lines 14-23. No new matter has been added by way of these amendments.

Rejections under 35 U.S.C. § 102(e) or 35 U.S.C. § 103(a)

Claims 1-4 and 6-11 stand rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over US Patent 6,656,633 B2 to Yamakawa et al. (hereinafter "Yamakawa").

Claim 5 stands rejected under 35 U.S.C. 103(a) as obvious over Yamakawa in view of JP 08-10747 to Kasuke (hereinafter "Kasuke").

Applicants respectfully traverse each of the above rejections.

Distinctions Over the Cited Prior Art

Applicants submit that Yamakawa is directed to a binder for an electrode for a lithium ion secondary battery. On the other hand, the present invention is directed to a binder for an electrode for an electric double layer capacitor. In the lithium ion secondary battery and the electric double layer capacitor, the charge and discharge systems are different from each other. In the lithium ion secondary battery, the charge and discharge is conducted by an electrochemical reaction wherein lithium ion in an electrolytic solution is exchanged between positive electrode and negative electrode. Meanwhile, in the electric double layer capacitor, the charge and discharge is conducted physically, meaning the system can physically acquire electric charge by absorbing and desorbing ions in an electrolytic solution onto an electrode

with an electric pressure between the electrodes. By having positive and negative charges arranged in an opposite position with a very narrow clearance at the interface between electrode and electrolytic solution, this system of Applicants' binder for electric double layer capacitor can realize significant charge and discharge in a moment of time.

As explained above, a binder having such a system can realize the significant charge and discharge in a moment of time in the electric double layer capacitor (e.g., see claim 11). However, this causes a swelling of the electrolytic solution of the binder of the electrode, having a significant influence on battery characteristics. In order to solve the swelling problem, Applicants have invented a binder composition preferably used for an electric double layer capacitor.

With regard to claims 7 and 8, Yamakawa does not teach or suggest the claimed method of producing an electrode for an electric double layer capacitor. As explained above, Yamakawa is directed to a binder for an electrode for a lithium ion secondary battery. On the other hand, the present invention is directed to a binder for an electrode for an electric double layer capacitor. During examination, statements in the preamble reciting the purpose or intended use of the claimed invention must be evaluated to determine whether the recited purpose or intended use results, in the case of process claims, in a manipulative difference between the claimed invention and the prior art. If so, the recitation serves to limit the claim. *See* MPEP § 2111.02(II). Here, Applicants submit that there is a manipulative difference between the recited electric double layer capacitor and the lithium ion secondary battery as disclosed by Yamakawa. Accordingly, Yamakawa cannot be properly applied against claims 7 and 8.

The electrolytic solution used for the electric double layer capacitor and the lithium ion secondary battery are different from each other. Applicants have surprisingly developed a binder composition which can solve the swelling problem, and discovered a binder composition comprising monomer units (a), (b), and (c) below.

monomer unit (a) : derived from a compound represented by the following general formula : $\text{CH}_2=\text{CR}^1-\text{COOR}^2$ (1);

monomer unit (b) : derived from an α , β - ethylenically unsaturated nitrile compound; and

monomer unit (c) : derived from a multifunctional ethylenically unsaturated carboxylic acid ester.

There exists in Yamakawa a binder for the lithium ion secondary battery comprising (a), (b), and (c), however, the monomer unit (c) was not considered to be essential.

The binder in Yamakawa is experimentally used for the electric double layer capacitor, and the results are compared to the binder of Applicants' invention in the attached **Declaration Pursuant to 37 C.F.R. § 1.132**. Binder No.1 is a binder composition of the present invention comprising monomer unit (a), (b), and (c). Binder No.2 is a binder of Yamakawa comprising three essential components described therein. Binder No.3 is the same binder as in example 1 of Yamakawa.

From the Declaration, it can be seen that when the binder of the present invention is used for the electric double layer capacitor (e.g., see claim 11), a swelling of the binder was significant and a discharge capacity is significantly decreased. Applicants believe that the diethylene glycol dimethacrylate and tetraethylene glycol dimethacrylate produce a cross-linking

structure in the binder. Therefore, the swelling of the binder in the electrolytic solution is suppressed, and the deterioration of the discharge capacities is prevented.

The Examiner turns to Kasuke to establish that the carbonaceous material comprises active carbon having a specific surface area of 30 m² or more. However, Applicants respectfully submit that the outstanding rejection cannot be maintained, in light of the superior and unexpected results of the present invention.

Evidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut *prima facie* obviousness. MPEP § 716.02(a). Evidence of unexpected results must be weighed against evidence supporting *prima facie* obviousness in making a final determination of the obviousness of the claimed invention. *In re May*, 574 F.2d 1082, 197 USPQ 601 (CCPA 1978).

Accordingly, Applicants respectfully request reconsideration and withdrawal of the outstanding rejections.

Discussion of Examiner's Response to Applicants' Arguments

The Examiner has taken the position that the presently claimed invention remains unpatentable over Yamakawa and Kasuke, individually or taken together, contrary to Applicants' previous arguments. Moreover, the Examiner has taken the position that there is more than one variable in the experimental data, thus the effect of the present invention is not evident. However, Applicants respectfully submit that the Examiner's position is improper and is based on a misunderstanding of the previously submitted Experimental Data.

Applicants respectfully submit that the experimental Data No. 1 corresponds to Example 2 of the present invention. Data No. 2 corresponds to the one in which the multifunctional ethylenically unsaturated carboxylic acid ester (component (c)) in Data No. 1 is substituted by ethylenically unsaturated carboxylic acid, which Yamakawa '633 considers as an essential component. Data No. 3 corresponds to the Example 1 of Yamakawa '633, which Yamakawa '633 considers as a primary example.

In other words, in the experimental data, there is only one variable determining whether to choose from either dimethacrylate (No.1) or acrylic acid (No. 2 and No.3) as a monomer to be added into acrylate monomer and nitrile monomer. Namely, the kind of the added monomer into acrylate monomer and nitrile monomer mixture is the only variable.

The Examiner notes that the multifunctional ethylenically unsaturated carboxylic acid ester in the Examples are just two (i.e., diethylene glycol dimethacrylate and tetraethylene glycol dimethacrylate) of those monomers within the scope of the present invention, which is not commensurate with the full scope of the present claims. However, the Examiner should note that the present claims have been amended to instead specifically recite "dimethacrylates, trimethacrylates, diacrylates and triacrylates."

Additionally, Applicants acknowledge that the "objective evidence of nonobviousness must be commensurate in scope with the claims which the evidence is offered to support." MPEP § 716.02(d). However, "[e]vidence that a compound is unexpectedly superior in one of a spectrum of common properties . . . can be enough to rebut a *prima facie* case of obviousness." No set number of examples of superiority is required. *In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987)(emphasis added). "[A]n applicant does not have to test all

the compounds taught by each reference, so long as the test is sufficient to permit a conclusion respecting the relative effectiveness of applicant's claimed compounds and the compounds of the closest prior art. *In re Payne*, 606 F.2d 303, 316, 203 USPQ 245, 256 (CCPA 1979). MPEP § 716.02(e).

Here, Applicants respectfully submit that the presently submitted Declaration sufficiently establishes that the Examples of diethylene glycol dimethacrylate and tetraethylene glycol dimethacrylate allow a person of ordinary skill in the art to infer the superior and unexpected results of the specifically tested monomers to each of those recited in the present claims.

In view of the foregoing, Applicants believe the pending application is in condition for allowance. A Notice of Allowance is earnestly solicited.

Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Monique T. Cole, Reg. No. 60,154 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By 

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Attachment: Declaration Pursuant to 37 CFR § 1.132